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EXAMINER

LEURIG, SHARLENE L

ART UNIT

PAPER NUMBER

2879

DATE MAILED: 07/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

10/007,398

Applicant(s)

SORG, JORG-ERICH

Examiner

Sharlene Leurig

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 15 and 16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on May 15, 2003 has been entered and acknowledged by the Examiner. The amendment to claim 1 has been entered.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 5, 6 and 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Latz et al. (5,043,716) in view of applicant's admission of the prior art.

Regarding claim 1, Latz discloses an LED light source comprising a basic body formed with a recess (Figures 3 and 8, elements 14 and 14A), only one LED (21 and 21A) disposed in the recess, a filling (23 and 23A) of a transparent material embedding the LED, and a potting compound (17 and 28) that acts as a convex lens (column 3, lines 15-16 and 50-51) and is in contact with the transparent filling. The upper side of the transparent filling is in a form fit with the concave underside of the lens and has a convex surface formed by the underside of the lens (Figures 3 and 8).

The Examiner notes that the claim limitation of the lens being obtained by means of prefabrication and then being placed on the filling prior to a final curing of the filling is

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drawn to a process of manufacturing, which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of a difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

Latz lacks disclosure of the transparent filling containing a converter material that converts the wavelength of light emitted by the LED.

The applicant's admission of the prior art teaches that converter substances are used in LEDs to convert the color of light emitted by the LED. Figure 1 shows a conversion layer (3) positioned directly over the LED and in which the light emitted from the LED is converted to a different wavelength (page 3, line 21 to page 4, line 1).

Therefore regarding claim 1, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Latz's LED so that the transparent filling material contains a material that converts emitted light to a different wavelength, as taught by the applicant's admission of the prior art, so that a number of different colors can be produced in devices using the same low-cost LED.

Regarding claim 2, Latz discloses a volume of a transparent filling (Figures 3 and 8, elements 23 and 23A) that is less than a free volume of the recess (14 and 14A) in which the LED is disposed.

Regarding claim 5, Latz lacks explicit disclosure of a blue light emitting LED based on GaN and a conversion layer to convert the emitted light to the yellow spectral range.

The applicant's disclosure teaches the common combination of a blue-light emitting diode based on GaN with a conversion layer producing yellow light (page 3, line 21 to page 4, line 4).

Therefore regarding claim 5, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Latz's LED with a blue-light emitting diode and a conversion layer that converts the emitted light to yellow light in order to produce the desired lighting effect.

Regarding claim 6, Latz also lacks explicit disclosure of an ultraviolet light emitting LED and a conversion layer to convert the emitted light to the visible spectral range.

The applicant's disclosure teaches the common combination of an ultraviolet light emitting diode (page 3, line 21) and its conversion to a longer wavelength (page 3, line 25) as in the visible range (page 2, line 5).

Therefore regarding claim 6, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Latz's LED with an ultraviolet-light emitting diode and a conversion layer that converts the emitted light to visible light in order to produce the desired lighting effect.

Regarding claim 9, Latz discloses an LED that is surface-mounted (Figures 3 and 8).

Regarding claim 10, Latz lacks disclosure of a transparent filling material that contains resin.

The applicant's admission of the prior art teaches that resin or another similar substance is well-known in the art as an embedding material (page 2, lines 9-10).

Therefore regarding claim 10, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Latz's LED with a resin-containing filling material in order to provide an embedding material composed of a readily-available compound.

Regarding claim 11, Latz lacks disclosure of a transparent filling material that contains epoxy resin.

The applicant's admission of the prior art teaches that epoxy resin is well-known in the art as an embedding material (page 3, lines 15-16).

Therefore regarding claim 11, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Latz's LED with an epoxy resin-containing filling material in order to provide an embedding material composed of a readily-available compound.

Regarding claims 12 and 13, Latz lacks a basic body containing thermoplastic material as well as two leadframes.

The applicant's disclosure teaches the use of thermoplastic material in the basic body of LED's in the art (page 3, line 8) as well as two leadframes, the first carrying the LED at a first electrical contact area and the second connected to a second electrical contact area of the LED by a bond wire (page 3, lines 1-7).

Therefore regarding claims 12 and 13, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Latz's LED with a

thermoplastic material for the body and two leadframes for providing electrical connections to the LED in order to provide sufficient stability and electrical connections for long-lasting operability of the LED.

Regarding claim 13, the Examiner notes that the claim limitation of the basic body being obtained by means of injection molding around the leadframes is drawn to a process of manufacturing, which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of a difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

Regarding claim 14, Latz discloses a recess defined by sloping and reflective sidewalls (Figures 3 and 8, elements 12 and 12A) (column 2, line 67).

3. Claims 3, 4, 7, 8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Latz et al. (5,043,716) in view of Miller et al. (6,155,699) (of record).

Latz discloses an LED light source with all the limitations discussed above, including a lens in contact with a convex filling and having a concave underside complementary to the convex upper side of the filling, but lacks a convex filling surface and an underside surface of a lens both formed at a constant distance from the LED or the geometrical center point of its active radiating area.

However, Latz discloses the disadvantageous aspect of prior LEDs that do not have sufficient brightness (column 1, lines 27-30).

Regarding claim 3, Miller teaches an LED light source having a convex wavelength-converting element (Figure 2, elements 28, 30 and 36) at a constant distance from the LED (column 3, lines 43-46; column 7, lines 5-9).

Regarding claim 4, Miller teaches the active region of the LED chip to be at the top of the LED chip (column 3, lines 49-50), so the geometrical center of the active area is also at a constant distance from the convex surface of the wavelength-converting element.

Miller teaches this configuration as a means to provide an LED light source improved in brightness and efficiency.

Therefore regarding claims 3 and 4, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Latz's LED light source with a constant distance between the LED and the convex surface of the filling in order to provide an LED with even light distribution and improved brightness.

Regarding claim 17, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Latz's LED light source with a filling having a convex upper surface at equidistant points from the LED in order to provide an LED with even light distribution, following the same reasoning as regarding claim 3.

Regarding claims 7 and 8, Latz also lacks disclosure of the degree of conversion along the optical path. However, it is well known in the optical art to improve the quality of emitted light from light sources.

Regarding claim 7, Miller teaches an LED configuration resulting in a conversion efficiency of greater than 60%, the maximum conversion efficiency of the prior art

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(column 2, lines 3-7 and 51-55). The distance between the LED and the convex wavelength-converting element (Figure 2, elements 28, 30 and 36) is integral to this achievement (column 7, lines 5-9).

Regarding claim 8, the active region of the LED chip is at the top of the LED chip (column 3, lines 49-50), so the geometrical center of the active area is also at a constant distance from the convex surface of the wavelength-converting element and is also therefore integral to this achievement. Since the aim of the art is to improve the degree of conversion, the greater conversion percentage of Miller's teaching than the claimed conversion percentage is taken to be a matter of finding the optimum value.

It would have been obvious to one having ordinary skill in the art at the time of the invention to aim for a 50% conversion degree, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum value involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Furthermore, regarding claims 7 and 8, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Latz's LED light source with a conversion efficiency percentage of 50% in order to improve the light quality of the LED source to an acceptable degree to suit a given standard.

Response to Arguments

4. Applicant's arguments, see Amendment A, filed May 15, 2003, with respect to the rejection(s) of claim(s) 1-14 and 17 under Kano et al. (3,875,456) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

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However, upon further consideration, a new ground(s) of rejection is made in view of Latz et al. (5,043,716).

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharlene Leurig whose telephone number is (703)305-4745. The examiner can normally be reached on Monday through Friday, 8:30am-5:00pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703)305-4794. The fax phone numbers

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for the organization where this application or proceeding is assigned are (703)308-7382 for regular communications and (703)308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Sharlene Leurig
July 1, 2003



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